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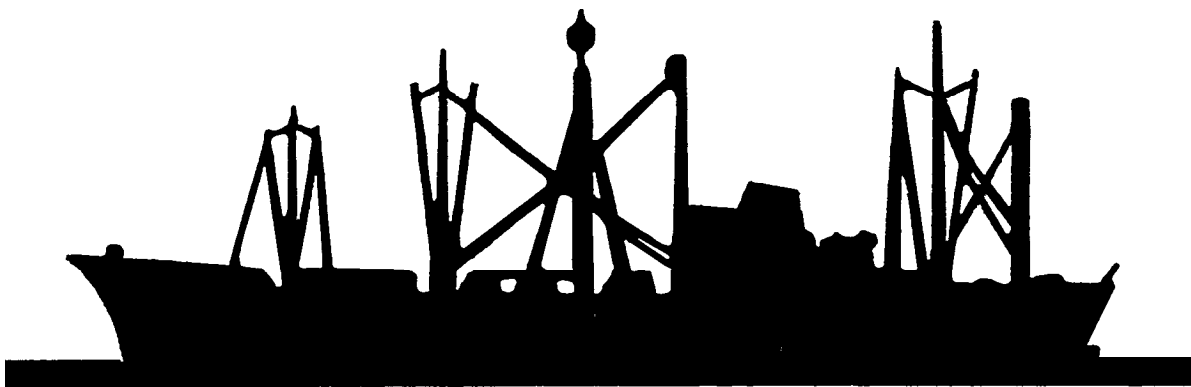
U.S. DEPARTMENT OF THE NAVY
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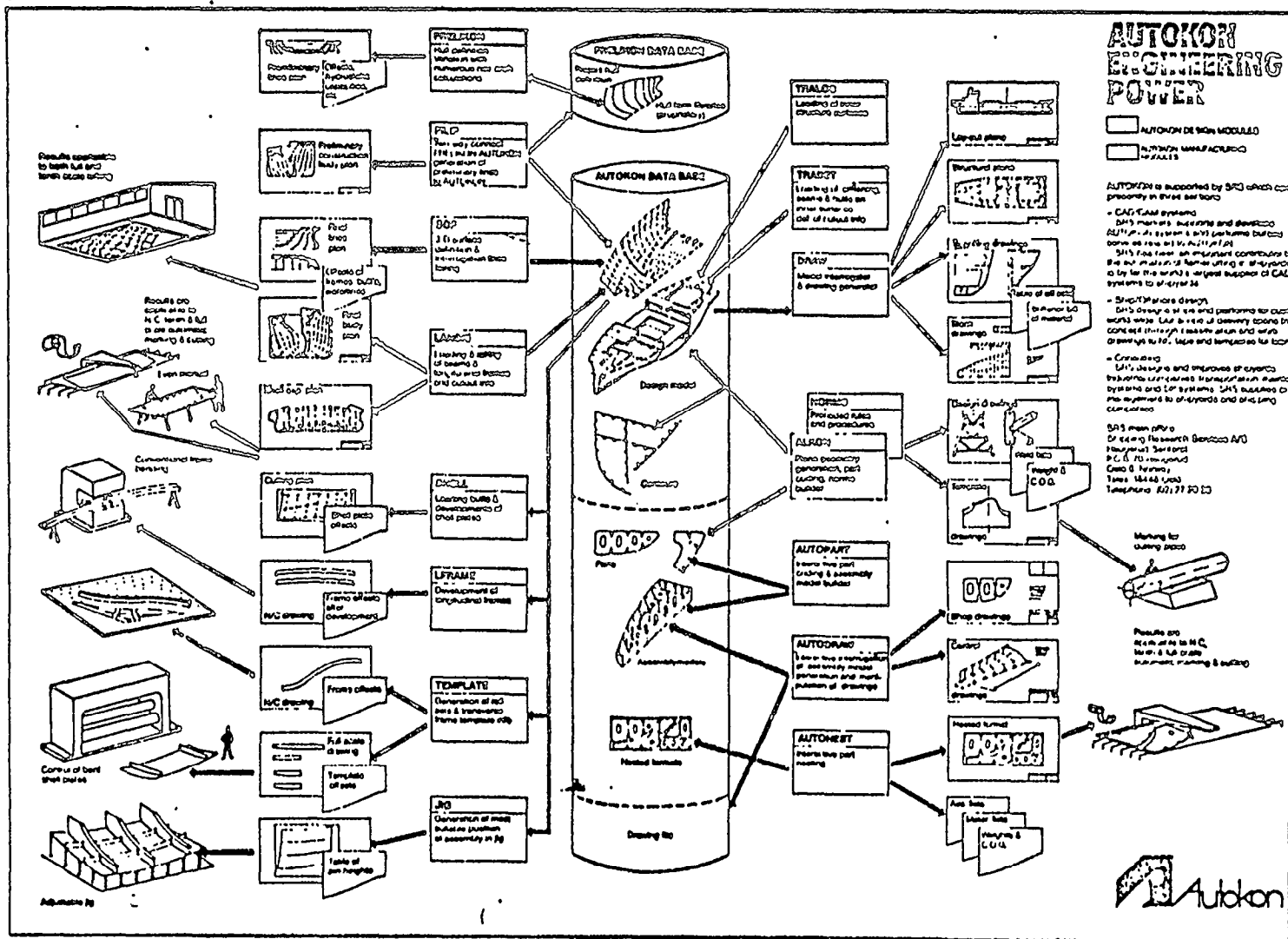
I R E A P S

USING AUTOKON FROM EARLY DESIGN:
RECENT EXPERIENCE FROM ACTUAL SHIP DESIGNS

Hans Oigarden
Shipping Research Services A/S
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ABSTRACT

This paper includes a short outline of design modules; results of a 12500 TDW chemical carrier; economical comparison between the first project which was a 11000 TRW anti the last project of a 12500 TDW chemical carrier done in SRS utilizing design modules; and the results from a 128000 TDW oil tanker, from an early design stage, to use of AUTODRAW.



TRALOS/TRADET/DRAW

Features:

- o Definition of the main surfaces in the ship
- o Definition of cut-outs
- o Definition of profiles and stiffenings
- o Definition of plate seams and thicknesses
- o Simple input to the program
- o Complete list of profiles used on the surfaces
- o Easy updating of data due to topological description
- o Generation of detailed drawings of the surfaces, including profiles and seams

For classification, steel and work drawings the modules TRALOS, TRADET and DRAW are used. These modules are used together with the other AUTOKON modules and store the results in the AUTOKON database. The results are stored both geometrically and topologically, which means that the data are related to each other. By changing some data, you will automatically have all related data updated as well.

This special feature makes it possible to drastically reduce the hours needed for alteration of drawings. At the same time you will always have access to the latest edition of drawings, and these drawings will show the correct geometrical results.

The TRALOS module is used for definition of any internal longitudinal surface in the ship; The surfaces may be plane (parallel to the center line), curved with chamber and sheer, or twisted. Or the surface can be a combination of the above mentioned. TRALOS will handle any type of conventional longitudinal surface, unless it has to be faired. It can also handle inner surfaces connected to an unsymmetrical body plan. The programme can handle three main groups of surfaces depending on the transverse configuration of the surface. Horizontal surface (HSUR) defining decks, tanktop etc. which do not have any vertical lines. This may be used for symmetrical body plan with the same type of surfaces, but unsymmetrical bodyplan (WSUR), finally vertical surfaces such as girders or similar which do not have any horizontal lines, and long bulkheads (VSUR).

TRADET

The module TRADET stores all the detailed data related to a TRALOS generated surface in the AUTOKON DATABASE, such as:

- 0 Profiles, beams and girders
- 0 Definition of all seams and butts describing type of joint, extension and related plate thicknesses
- 0 Definition of minor internal structures, including extensions and connecting surfaces
- 0 Definition of connections between surfaces with necessary identification and type of connection, such as open, water tight etc.

The profiles are split into relevant groups and will be identified with a profile number and on which side of the ship they belong. Profile orientation is established according to the "View" from which the profile is seen.

Joints between the various parts are called seams. The seams are also split into relevant groups and are identified in the same way as the profiles. In addition the thickness and type of weld is taken into consideration.

DRAW

The DRAW module is used to generate drawings with different levels of detailing.

Scantling drawings which includes graphical lines of any structure penetrating the drawn surface.

If the penetrating profiles have been defined, the drawing will also include the cut-out contours.

Structural drawings which include information of the scantling drawings plus the graphical details belonging to the surface itself such as:

- o Stiffeners
- o Seams
- o Connections of minor and major parts
- o Inner contours

"windows" can be defined for detailing of the drawing. Symbols are added for the seams. Stiffeners and profiles, minor or major structures, will be drawn either with a continuous line or various dotted lines depending on the type of connection and profile location. (This side or other side).

Results from a 12500 TDW Chemical Carrier

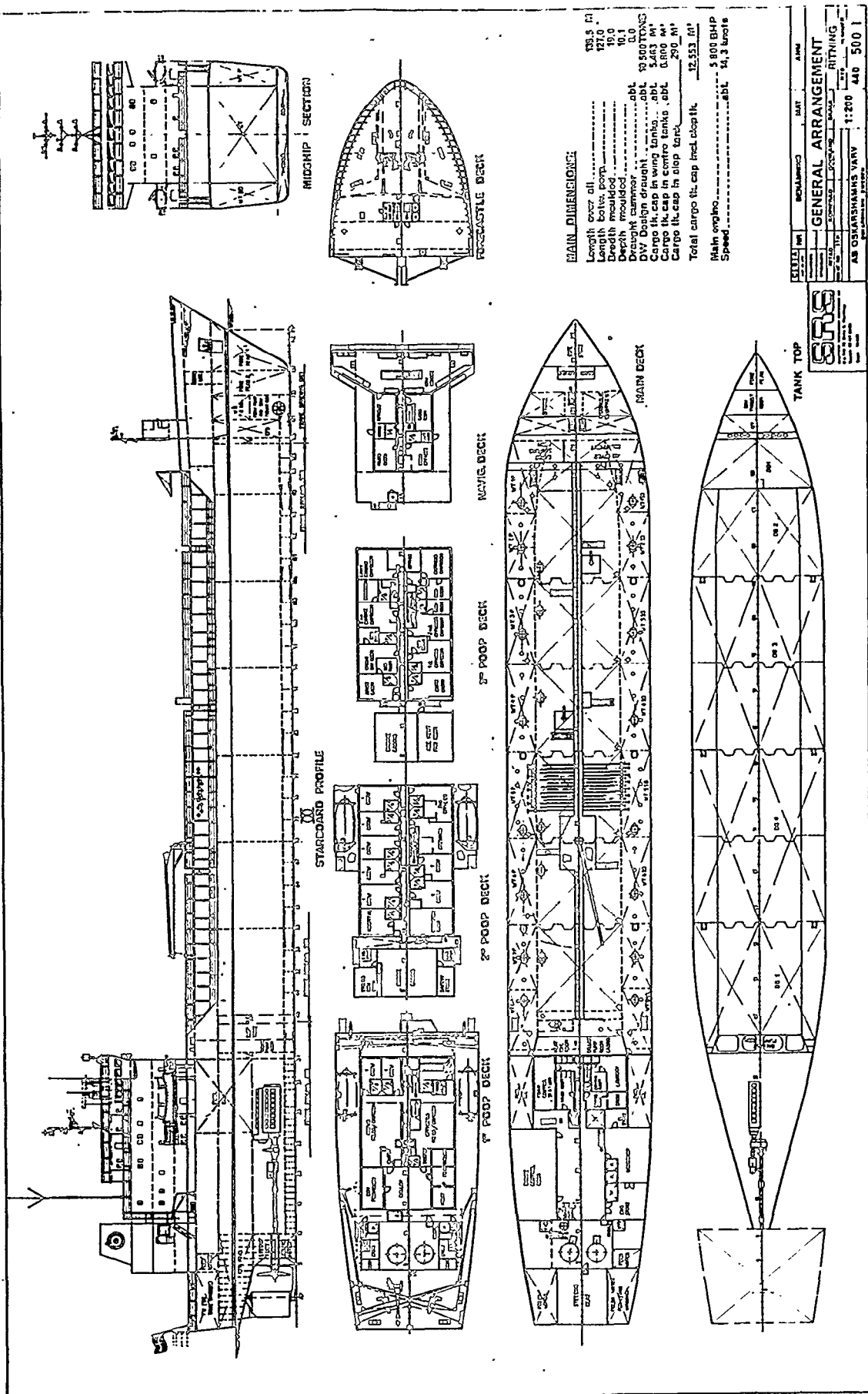
The work started for this vessel in January 1981, and very similar to a smaller vessel designed one year earlier.

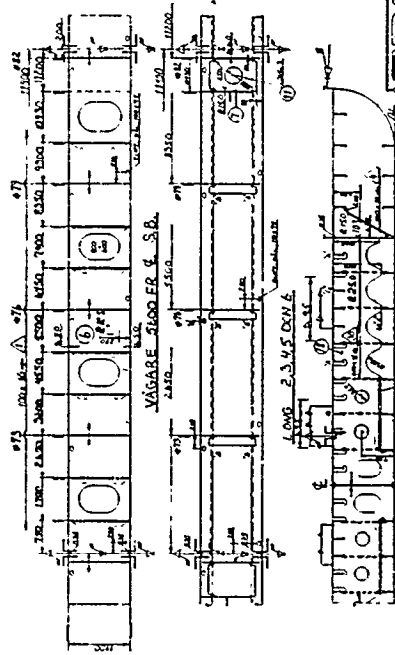
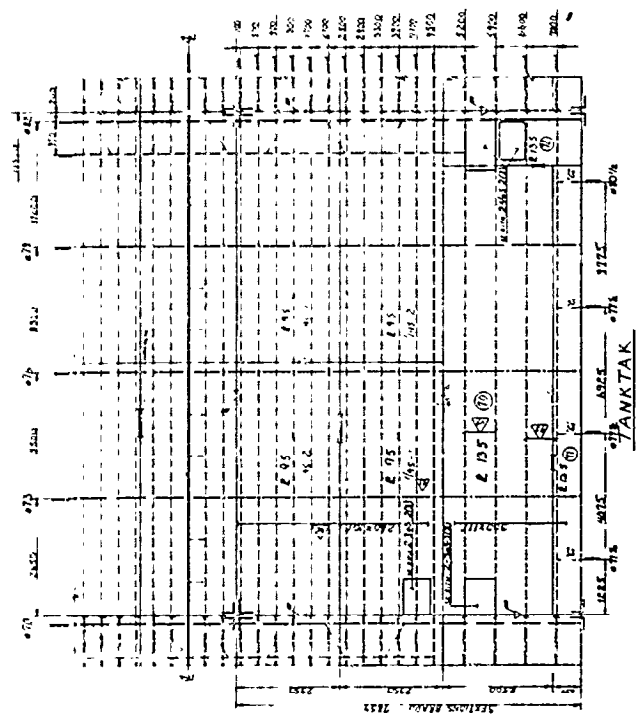
The scope of supply for this vessel was the same as for the first one.

Project drawings and documentation, classification drawings for steel, machinery, accommodation and outfitting.

Working drawings, Pipe diagram and pipe sketches.
Complete lofting.

On the following pages, typical drawings can be seen. These types of drawings have not only been used by the steel people, but also machinery and outfitting departments have used these drawings for their purposes.





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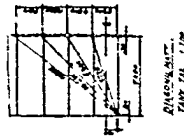
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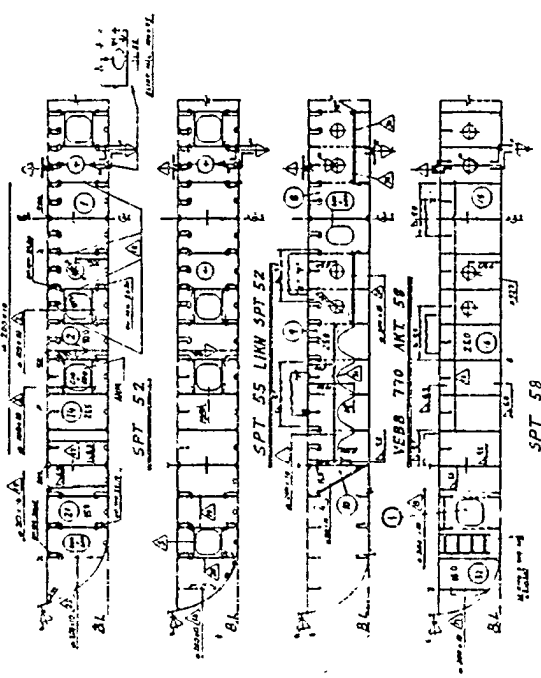
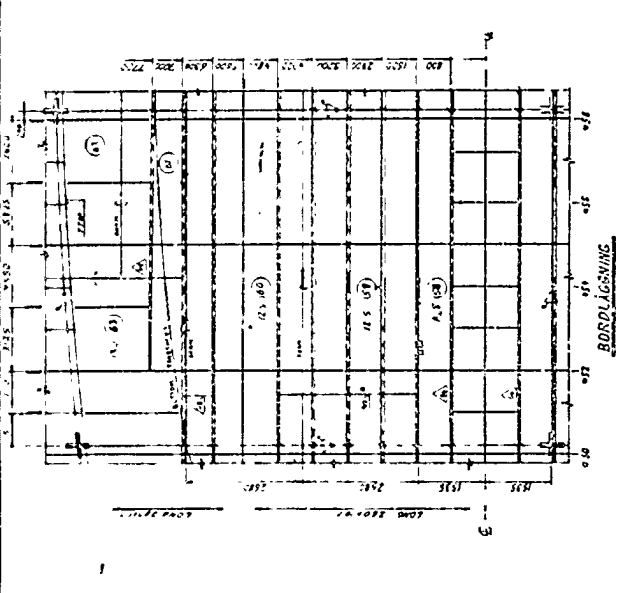
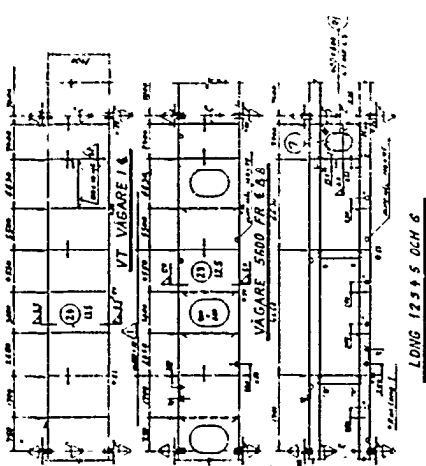
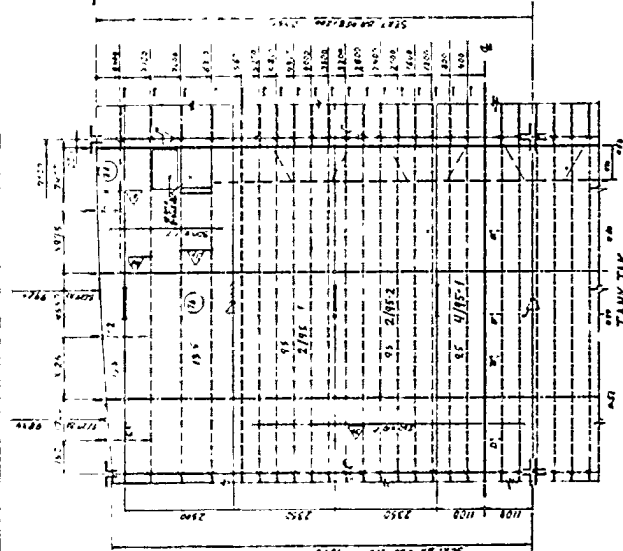
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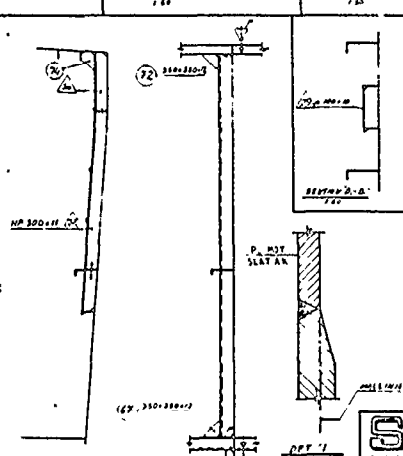
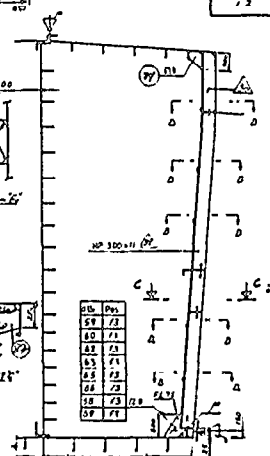
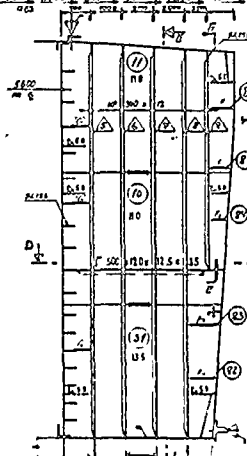
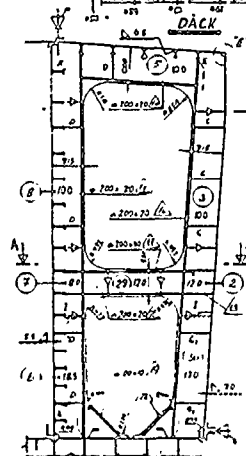
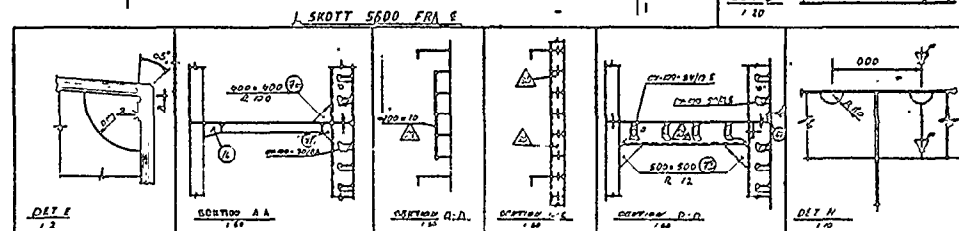
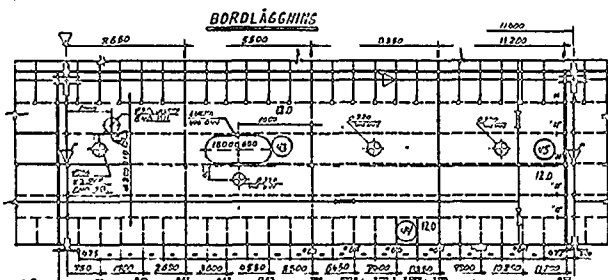
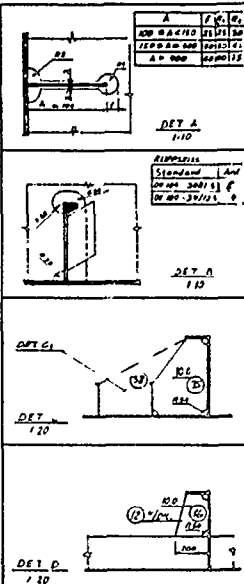
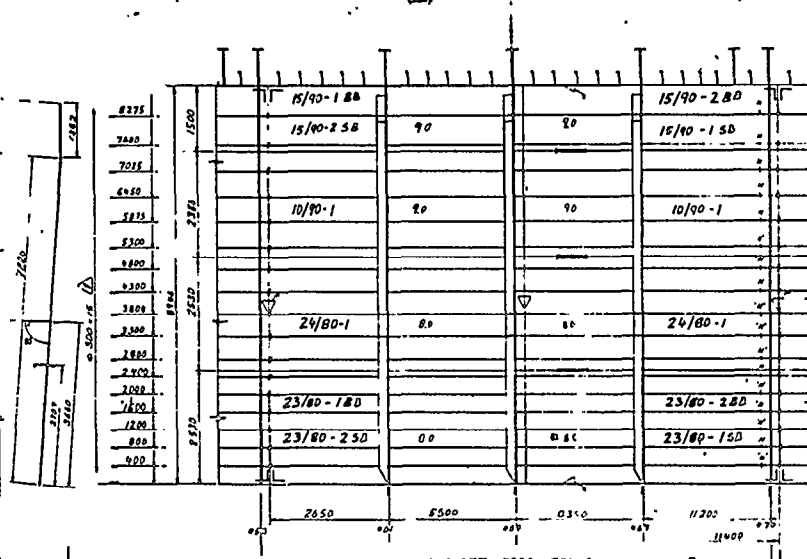




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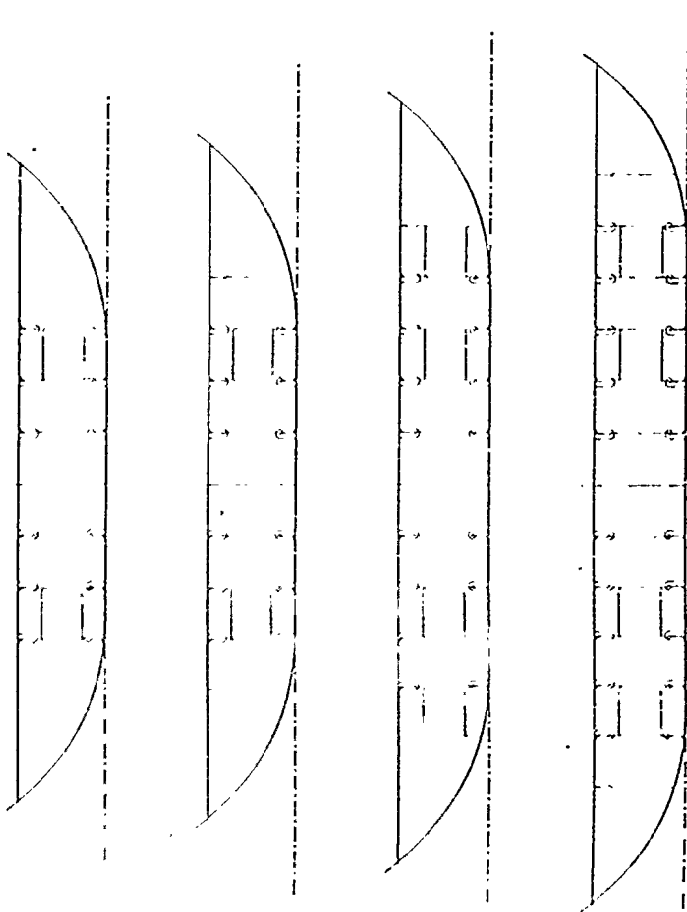
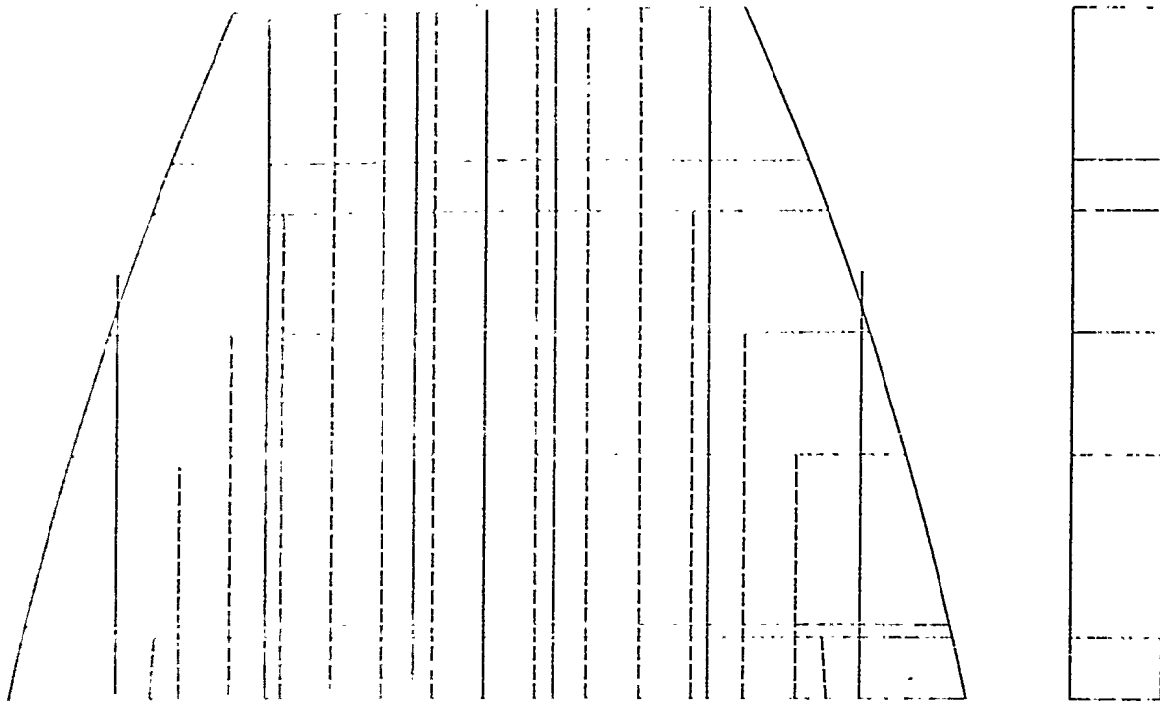
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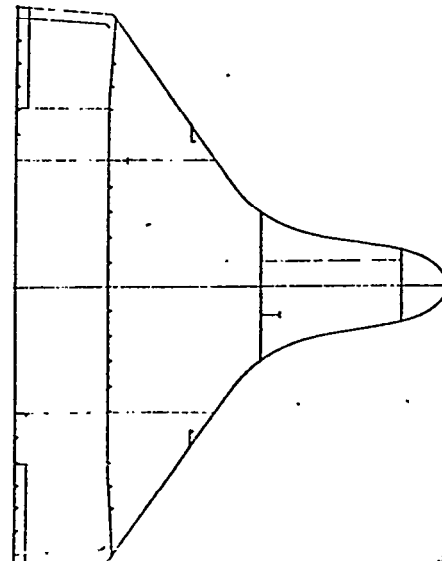
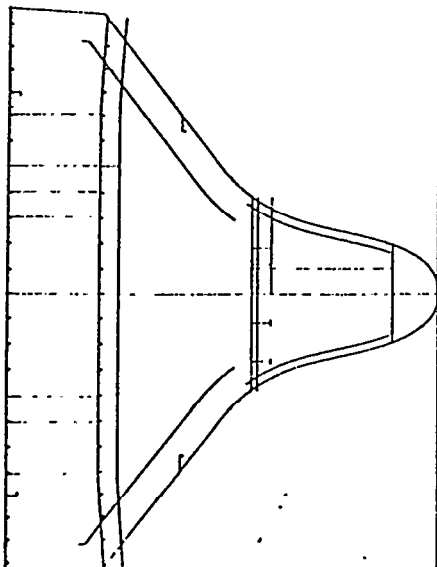
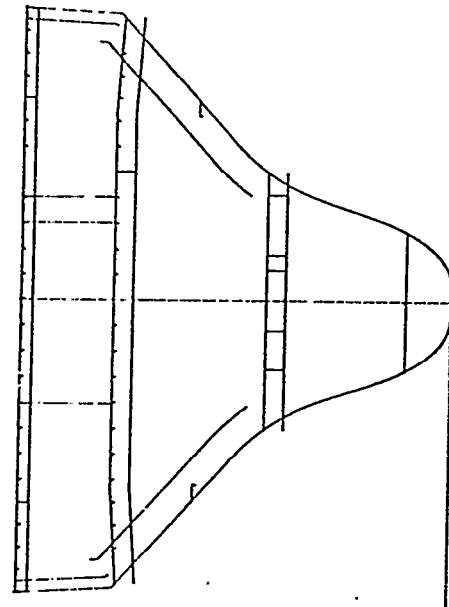
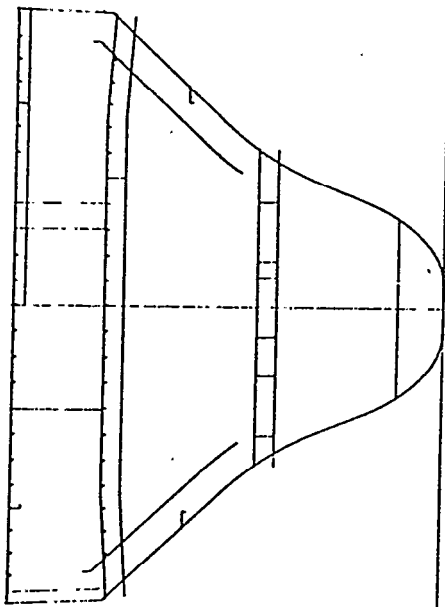
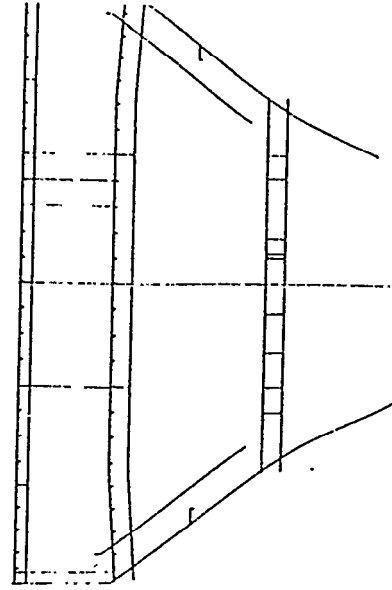
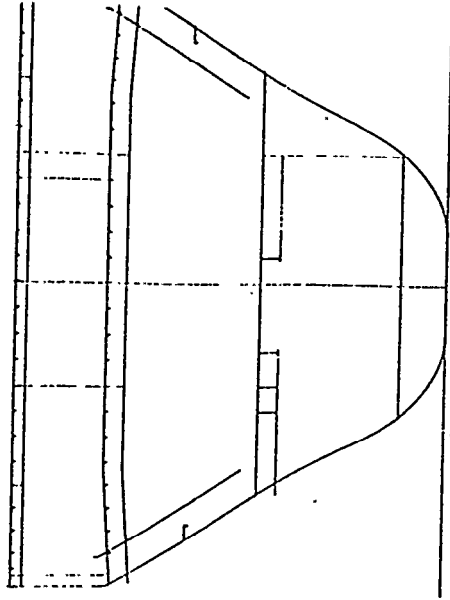


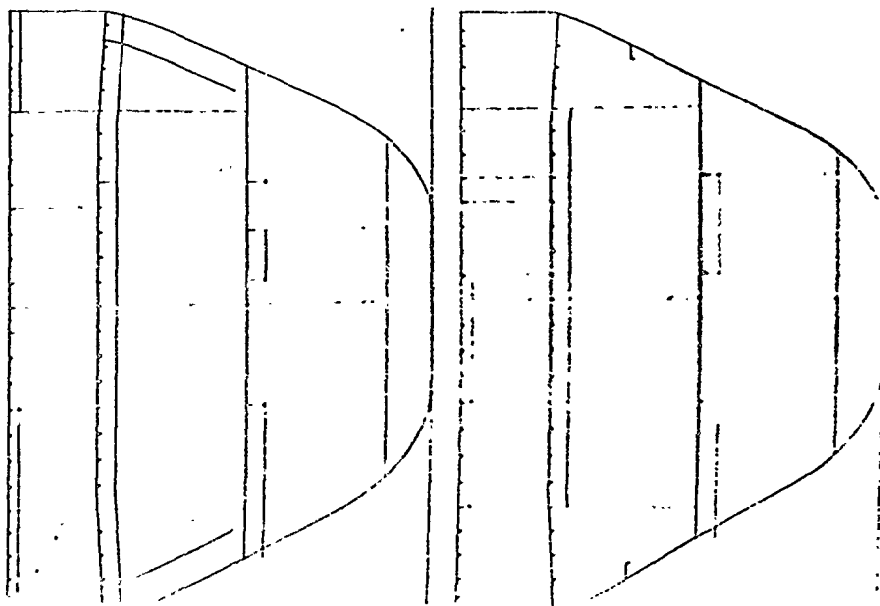
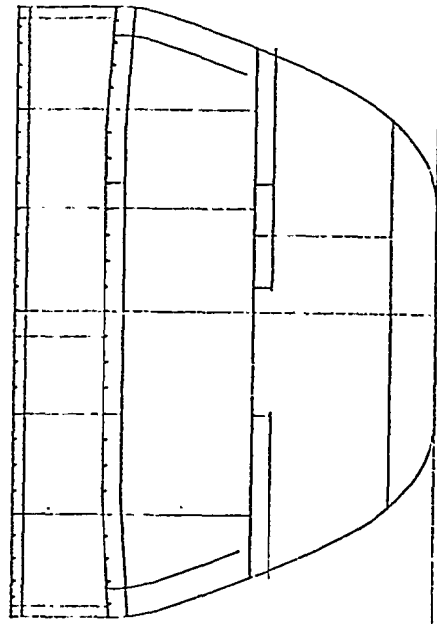
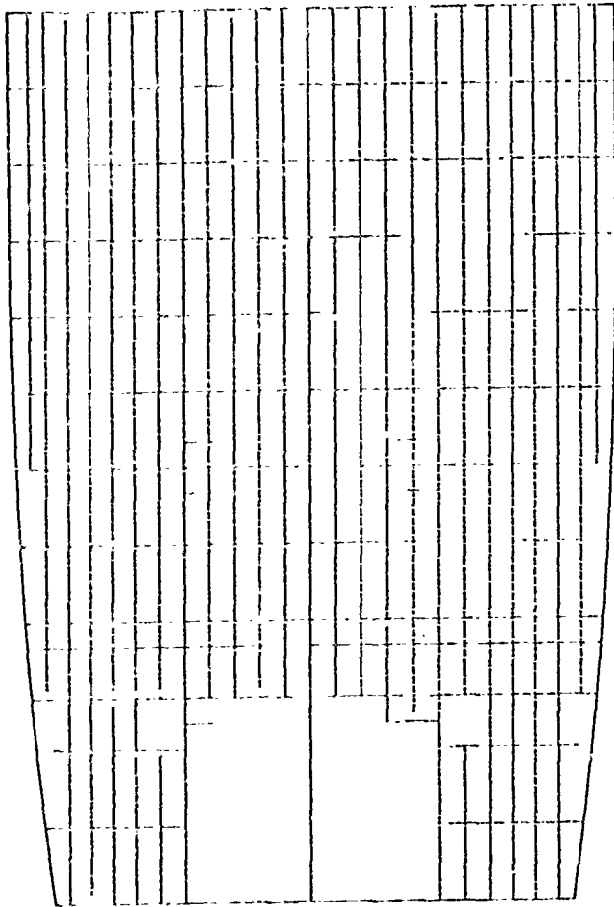


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Economical comparison between a 11000 TDW and a 12500 TDW
Chemical Carrier.

	125000 mw	11000 TDW
Classification drawings	1450 hr 30%	2500 hr 36%
Working drawings	2700 hr 57%	3070 hr 45%
TRALOS/TFUDET	255 hr 5%	680 hr (400) * 10%
Material take off	465 hr 8%	600 hr 9%
Total	<u>4790 hr</u>	<u>6850 hr</u>

Diff: 2090 hr or 30% less manhours.

* Since this was a pilot project 400 hr. direct waste getting the system working, and slow drawing machine.

On first project we had 16% reduction and 25% possible reduction if the system had run smoothly compared with traditional made drawings.

The second project we would have saved 34% if we had the same base of calculation as the first project, so 34% and 16% can be compared with each other.

Results from a 128000 TDW Oil Tanker,
from an early design stage, to use of AUTODRAW.

The scope of work for this vessel were to deliver classification drawings.

To get a bodyplan for this vessel within time for our schedules, we had time to fair aft body, and fwd body, but we had to use preliminary lines from PRELIKON by FILIP. This meant we were able to start to create drawings for the complete vessel three weeks earlier. The total time spent on TRALOS and TRADET was about 60 hours.

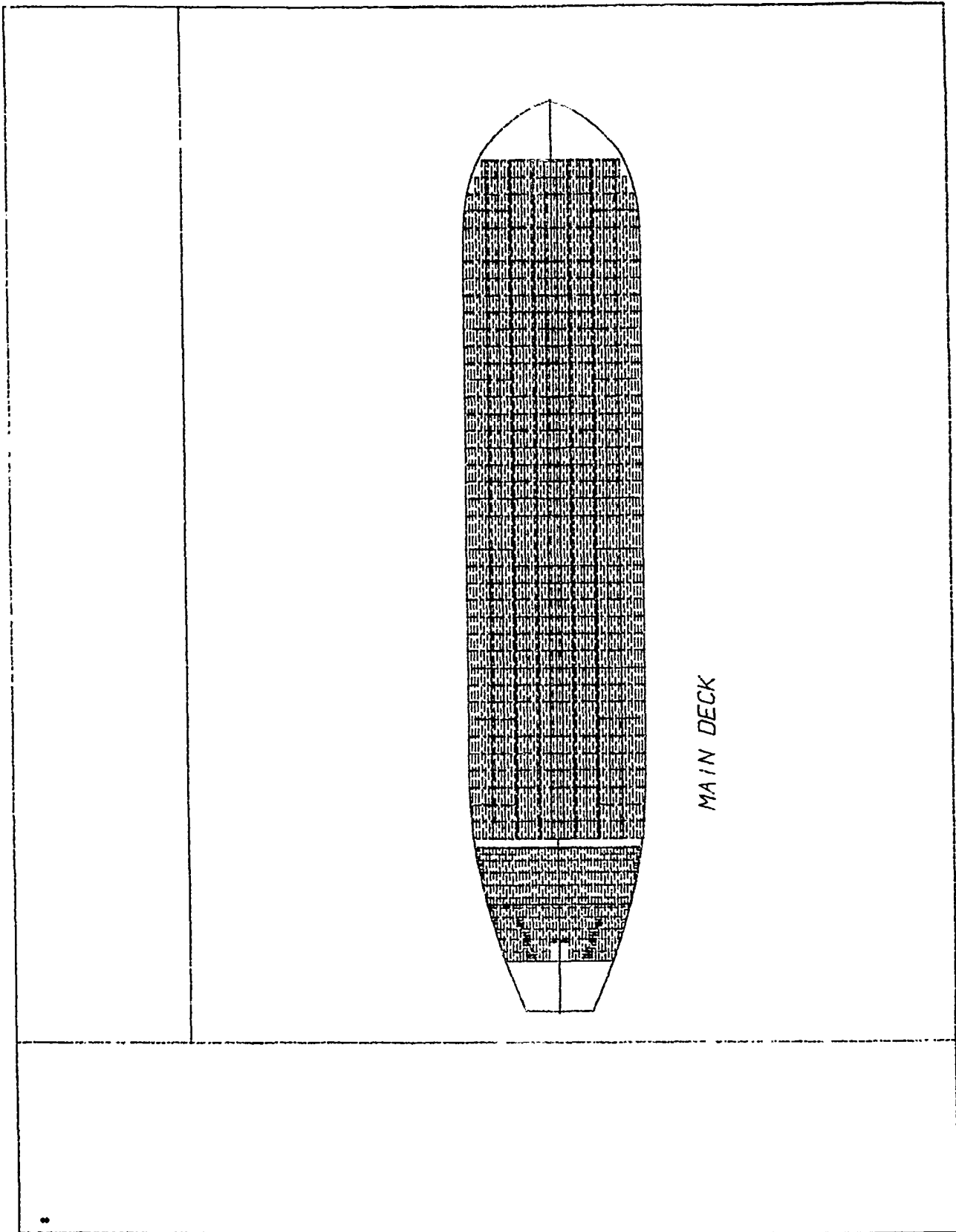
The reason for not spending more time on the designmodules, was simply that with this amount of input we got the greatest benefit out of the system compared with type of drawings to be delivered. Also to keep in mind that we were not going to do any working drawings or lofting on this vessel. If so, we would have done more work on the design modules.

Time spent on class. dwgs	2100 hours
Material spec.	430 hours

This excludes superstructure and rudder of the vessel.

Normal time for this type of vessel would be about 3000 hours.

This means about 25% saving on the class drawings.



The next step to save time in the drawing process, is to have an automation. for texting and symboles (details) in the computer. This can be done by taking the papertapes from Tralos, Tradet to Autodraw, and do the completion of the drawing in Autodraw.

This we have done with some drawings and the result for this seems satisfactory.

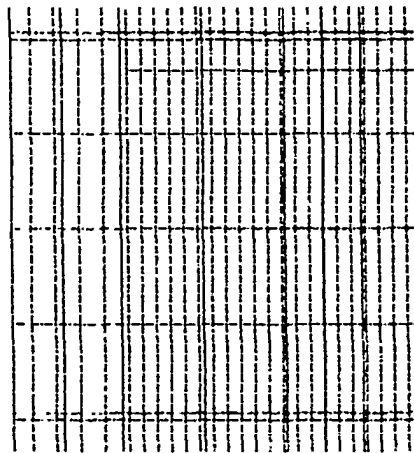
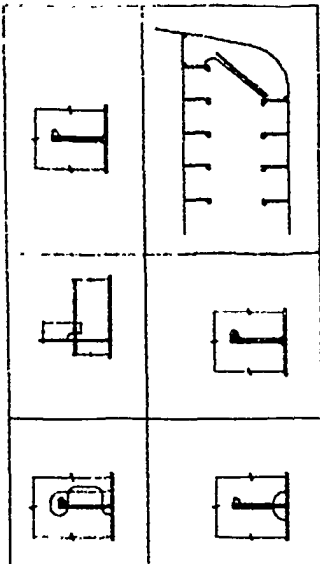
We have made a number of standard steel details which is used regulary, and placed them on the drawings.

The time spent for building up a working drawing, can be reduced considerably. As an indication we are talking about 15 - 20 hrs. to get a complete working drawing. Normal time for such a drawing is about 40 hours.

This means a saving of 50% for 62%.

This would also be valied for classification drawings, but the saving less. About 30% to 40%.

These reductions are of course dependent on the standard steel detail library available.



TANK TAK



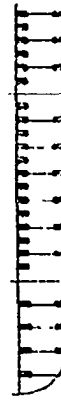
SPT. 75



SPT. 75 L INN. SPT. 75



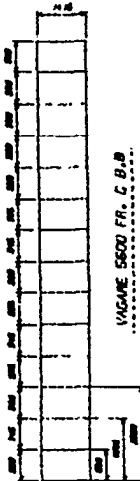
SPT. 75 L INN. SPT. 75



SPT. 82



VT. VAGARE J C



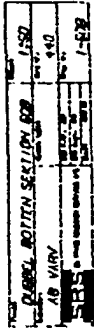
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DOUBLE BOTTOM SECTION 608
AB VIEW
1-50
1-40
1-30

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